1894MNRAS..54..509K

p. 95, and Pl. III. fig. 8) describes and delineates the nebula as pretty bright, extended, split into two parallel rays, the split extending its whole length, the *following* part being partially filled with faint nebulosity. Eight observations were made between the years 1848 and 1866. The drawing well represents the greater part of the nebula.

The photograph shows it like a nebulous ring viewed edgewise, with a large dense central condensation, and that the ring along its periphery is divided into two parts parallel with each other by a broad dark band, or ring, which shuts from view the light of the central condensation. The two extremities of the diameter of the supposed nebulous ring show expansions of the nebulosity, and there are two stars apparently involved in the faint nebulosity at the *south following* extremity.

I may add that the time is approaching, if it has not already arrived, when discussion concerning the developments of these gigantic celestial bodies may be profitably undertaken, for reliable evidence showing their forms and structures is rapidly accumulating.

The existing classification of the nebulæ into bright, faint, very faint, very large, &c., is much too indefinite a description of the objects as they are now depicted to us by photography. They will require a classification which will define the principal characteristics of their forms, structure, brightness, and their spectra.

Remarks on Dr. Roberts's Photographs of Star Clusters.

By E. B. Knobel.

In considering the photographs of Star Clusters which have been presented to the Society from time to time by Dr. Roberts, I have been repeatedly struck by the great difference in the appearance of the object in the photograph compared with the view in the telescope. Stars which were conspicuous in eye observation did not show the same prominence in the photograph, and the great variation of magnitude in stars in the same field of view was not apparent. At first I was inclined to consider this anomaly as due to the long exposure employed, which brought upon the photographic plate a vast number of stars not discernible to the eye, and thus the configuration and general appearance so familiar in the telescope might be masked; but this explanation seemed hardly to be borne out by more minute examination. The fact seemed evident that, so far from these photographs showing the stars in their true relative magnitude, as has been claimed, there is an untrue and unnatural uniformity in the magnitudes which required investigation.

At the last meeting of the Society Dr. Roberts exhibited a photograph of the nebula 74 Piscium, with which object I was

1894MNRAS..54..509K

familiar, and of which I had made a drawing many years ago. I believed I had indicated the relative magnitude of stars in the drawing as they appear to the eye in the telescope. It was obvious on comparing it with the photograph that I had shown a wider range of magnitude than we should infer from the photograph, and that there was an equality about the photographic magnitudes at variance with the eye observations.

If we compare photographs of the same object taken by a refractor, and a reflector, the difference to which I call attention is most conspicuous, and the fact cannot be disputed. The refractor photographs present a portrait of the object as one is familiar with it in the telescope, whereas the others are puzzlingly unlike.

To obtain further information on this point, I have measured the diameters of a fair number of stars in Dr. Roberts's photographs and in photographs of the same objects taken with refractors, limiting the selection to those stars which have marked density in the silver deposit. The measurements were made with a glass micrometer ruled to 0·005 of an inch, employing a magnifier of long focus. In all cases the measurements were made from the paper reproductions and not from the negatives, but the results thus obtained may be considered as sufficiently accurate for the purposes of the present paper. In such work much difficulty is found in deciding what to measure, seeing that the size of some discs may be affected by halation, and in other cases the unsymmetrical image produced by the Newtonian reflector renders accurate measures uncertain, and consequently some discrimination has to exercised. For convenience of discussion the relative areas of the star discs, being the squares of the measured diameters, are given in terms of the smallest star selected in each case.

The photographs taken for comparison with those of Dr. Roberts are for the Pleiades, the beautiful photograph by MM. Henry which was engraved and published by the Paris Observatory, and a fine photograph recently taken by M. Trépied with the astro-photographic telescope of the observatory at Algiers. For the region in *Cygnus*, and for the cluster 35 Messier, I have used the well-known photographs of MM. Henry, which, however, have the peculiarity that they were made with a triple exposure; consequently, with the smaller star discs there is a little more uncertainty in the exact dimensions, but not sufficient to affect the general conclusions arrived at; for the nebula N.G.C. 1977 *Orionis*, a special photograph taken by the MM. Henry, the enlargement of which is nearly on the same scale as Dr. Roberts's photograph of the *Orion* nebula.

The star numbers are those of a provisional list, and have no reference to Bessel's or other catalogues.

1894MNRAS..54..509K

Relative Areas of Star Discs in Photographs of the Pleiades.
By Henry, Trépied, and Roberts.

Star No.	Mag.		Henry.	Trépied.	Roberts.
39	6·4	Pickering.	25·00	32·11	4·00
3	6·7		21·39	28·44	4·00
32	6·6		20·25	28·44	4·41
2	6·9		20·25	25·00	4·00
42	6·9		18·06	21·80	4·00
6	6·6		16·00	21·80	4·00
7	7·5		14·06	16·00	3·61
17	7·5		13·14	14·70	3·24
19	7·9		13·14	12·25	3·24
27	7·4		12·25	20·25	4·00
35	8·0		12·25	13·44	2·56
9	8·1		11·39	12·25	2·56
25	7·8		11·39	16·00	3·61
24	9	Henry.	7·56	7·11	2·25
36	9		6·25	5·44	1·96
40	9		6·25	5·76	1·82
5	10		5·06	4·70	2·25
12	10		6·25	6·25	1·96
18	10		4·51	2·05	1·96
8	10		5·06	4·70	2·89
37	10		4·00	3·36	1·69
41	10		3·51	2·25	1·32
30	11		2·25	1·80	1·44
31	11		2·25	1·80	1·00
38	11		2·25	1·00	1·00
16	11		2·25	1·80	1·69
34	11		2·25	1·00	1·00
4	11		2·25	1·36	1·21
28	11		1·56	1·00	1·21
29	11		1·56	1·00	1·21
33	11		1·89	1·14	1·00
23	11		1·56	1·36	1·21
13	11		1·56	1·00	1·21
14	11		1·00	1·36	1·69